LPDES PERMIT NO. LA0111180 (Agency Interest No. 92534)

LPDES STATEMENT OF BASIS
FOR THE DRAFT LOUISIANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (LPDES) PERMIT TO DISCHARGE TO WATERS OF LOUISIANA

I. Company/Facility Name: Hexion Specialty Chemicals, Inc.
Post Office Box 232
Geismar, Louisiana 70734

II. Issuing Office: Louisiana Department of Environmental Quality (LDEQ)
Office of Environmental Services
Water Permits Division
Post Office Box 4313
Baton Rouge, Louisiana 70821-4313

III. Prepared By: Melanie Connor
Industrial Water Permits Section
Water Permits Division
Phone #: (225) 219-3088
Fax #: (225) 219-3309
E-mail: melanie.connor@la.gov

Date Prepared: September 10, 2009

LAC 33:IX Citations: Unless otherwise stated, citations to LAC 33:IX refer to promulgated regulations listed at Louisiana Administrative Code, Title 33, Part IX.

40 CFR Citations: Unless otherwise stated, citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations in accordance with the dates specified at LAC 33:IX.4901, 4903, and 2301.F.

IV. Permit Action/Status:

A. Reason for Permit Action:

Proposed reissuance of a Louisiana Pollutant Discharge Elimination System (LPDES) permit for a 5-year term following regulations promulgated at LAC 33:IX.2365/40 CFR 122.46.

In order to ease the transition from NPDES to LPDES permits, dual regulatory references are provided where applicable. The LAC references are the legal references while the 40 CFR references are presented for informational purposes

only. In most cases, LAC language is based on and is identical to the 40 CFR language. 40 CFR Parts 401, 405-415, and 417-471 have been adopted by reference at LAC 33:IX.4903 and will not have dual references. In addition, state standards (LAC 33:IX. Chapter 11) will not have dual references.

B. LPDES permit: Permit Effective Date – August 1, 2004
Permit Expiration Date – July 31, 2009

C. Application submittal date: Application submitted on January 28, 2009

V. Facility Information:

A. Location – 9288 Louisiana Highway 75, Geismar, Ascension Parish (Latitude 30°11'59", Longitude 90°01'9").

B. Applicant Activity -

Hexion Specialty Chemicals, Inc. is an existing facility that produces aqueous formaldehyde, urea-formaldehyde concentrate, and methaform. The facility has five formaldehyde process units (Formaldehyde Plants 1, 2, 3, 4 and 5). Formaldehyde is formed from the gas phase reaction of methanol and air. No process wastewaters are discharge from the facility. All process streams and potentially contaminated wastewaters (i.e. washdown waters, etc) will be collected and reused for process makeup water. Therefore, the effluent guidelines established at 40 CFR 414 are not applicable to the facility.

C. Fee Rate -
1. Fee Rating Facility Type: Minor
2. Complexity Type: II (Complexity has been reduced based upon the fact that the facility does not discharge process wastewaters)
3. Wastewater Type: I
4. SIC code: 2869

VI. Receiving Waters: Mississippi River (Outfalls 001 and 101), and
Unnamed drainage ditch thence to New River (Outfall 002)

A. Outfalls 001 and 101:

1. TSS (15%), mg/L: 32.0 mg/l*
2. Average Hardness, mg/L $CaCO_3$: 153.4 mg/l*
3. Critical Flow, cfs: 141,955 *
4. Mixing Zone Fraction: 1/3 *

5. Harmonic Mean Flow, cfs: 366,748*
6. River Basin: Mississippi River, Segment No.: 070301
7. Designated Uses: primary contact recreation, secondary contact recreation, fish and wildlife propagation, and drinking water supply

* Stream Data information based upon the following: Water Quality Management Plan, Volume 5A, 1994; LAC 33:IX Chapter 11. Hardness and 15% TSS data come from the monitoring station #319 on the Mississippi River listed in Hardness and TSS Data for All LDEQ Ambient Stations for the Period of Record as of March 1998, LeBlanc.

B. Outfall 002:

River Basin: Lake Pontchartrain Basin, Segment 040404

Designated Uses: primary contact recreation, secondary contact recreation, and fish and wildlife propagation

VII. Outfall Information:

Outfall 001

A. Type of wastewater – The intermittent discharge of non-contact cooling tower blowdown, non-contact boiler blowdown and previously monitored, and treated sanitary wastewater from Internal Outfall 101

B. Location – At the point of discharge from Tank 48 prior to combining with the waters of the LC Geismar Services, LLC Common Wastewater Effluent Line (Latitude 30°12'47", Longitude 91°01'32")

C. Treatment – pH adjustment

D. Flow – 0.148 MGD, Intermittent

E. Receiving waters – Mississippi River

F. Basin and segment – Mississippi River Basin, Segment 070301

Outfall 101

A. Type of wastewater – The intermittent discharge of treated sanitary wastewater

B. Location – At the point of discharge from the treatment facility prior to combining with other waters

C. Treatment – biological package treatment unit

D. Flow – 0.0008 MGD

E. Receiving waters – To Final Outfall 001, thence to the Mississippi River

F. Basin and segment – Mississippi River Basin, Segment 070301

Outfall 002

A. Type of wastewater – The intermittent discharge of low contamination potential stormwater runoff and utility wastewaters including but not limited to safety shower-eyewash stations and fire water

B. Location – At the point of discharge from the drain pipe under the rail spur at the northwest corner of the property prior to combining with other waters

C. Treatment – None

D. Flow – 0.232 MGD, intermittent

E. Receiving waters – unnamed drainage ditch, thence to New River

F. Basin and segment – Lake Pontchartrain Basin, Segment 040404

VIII. Proposed Permit Limits and Rationale:

The following section sets forth the principal facts and the significant factual, legal, methodological, and policy questions considered in preparing the draft permit.

A. PROPOSED CHANGES:

1. Outfall 001 – TDS monitoring has been removed from the permit. TDS monitoring was included in the previous permit due to the fact that TDS levels are known to be relatively high in cooling tower blowdown discharges. Footnote of the previous permit states that "...a future total dissolved solids numerical limitation may be required if total dissolved solids are found to cause instream concentrations to exceed water quality criterion." Water quality screening was done at Outfall 001 using the maximum TDS value reported between 2006 and 2009. The screen indicated that there is no reasonable potential for TDS from the facility to exceed water quality criterion for the receiving stream.
2. Outfall 101 - The statistical basis for flow, BOD_5, TSS and Fecal Coliform has been changed from a weekly average to a daily maximum based upon current LDEQ guidance for sanitary wastewater discharges at industrial facilities.
3. Outfall 101 – Monthly average limitations for BOD, TSS and Fecal Coliform have been added to the permit in accordance with the Class I Sanitary Wastewater General Permit (LAG530000) and current office guidance for permitting sanitary wastewater from industrial facilities.

B. TECHNOLOGY-BASED VERSUS WATER QUALITY STANDARDS-BASED EFFLUENT LIMITATIONS AND CONDITIONS

Following regulations promulgated at LAC 33:IX.2707.L.2.b/40 CFR Part 122.44(l)(2)(ii), the draft permit limits are based on either technology-based effluent limits pursuant to LAC 33:IX.2707.A/40 CFR Part 122.44(a) or on State water quality standards and requirements pursuant to LAC 33:IX.2707.D/40 CFR Part 122.44(d), whichever are more stringent.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS AND CONDITIONS

Regulations promulgated at LAC 33:IX.2707.A/40 CFR Part 122.44(a) require technology-based effluent limitations to be placed in LPDES permits based on effluent limitations guidelines where applicable, on BPJ (best professional judgement) in the absence of guidelines, or on a combination of the two. Because there are no effluent guidelines applicable to the discharges from Hexion Speciality Chemicals, Inc., limitations are based upon BPJ.

WATER QUALITY-BASED EFFLUENT LIMITATIONS

Specific analytical results from the permittee's application and DMRs were screened against state water quality numerical standard based limitations by following guidance procedures established in the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, LDEQ, October 7, 2009.

In accordance with 40 CFR 122.44(d)(1)/LAC 33:IX.2707.D.1., the existing discharge was evaluated in accordance with the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, LDEQ, October 7, 2009, to determine whether pollutants would be discharged "at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard." Calculations, results, and documentation are given in Appendix A.

As a result of the screen, no pollutants received water quality based effluent limitations.

Minimum quantification levels (MQLs) for state water quality numerical standards-based effluent limitations are set at the values listed in the Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards, LDEQ, October 7, 2009. They are also listed in Part II of the permit.

C. PROPOSED EFFLUENT LIMITATIONS

Outfall 001 – The intermittent discharge of non-contact cooling tower blowdown, non-contact boiler blowdown and previously monitored, and treated sanitary wastewater from Internal Outfall 101

Parameter	Proposed Permit Limitations		Monitoring Frequency
	Monthly Average	Daily Maximum	
Flow (MGD)	Report	Report	1/month
pH	6.0 s.u. (Min)	9.0 s.u. (Max)	1/month
TOC	---	50 mg/L	1/month
Oil & Grease	---	15 mg/L	1/month
Temperature (°F)	---	Report	1/month

EFFLUENT LIMITATIONS BASIS for Outfall 001:

Flow: The requirement to report flow is based upon LAC 33:IX.2707.I.1.b.

TOC and Oil & Grease: Limitations are based upon current utility wastewater guidance and the previous permit.

pH: Requirements are based upon LAC 33:IX.1113.C.1.

Temperature: Reporting requirements for Temperature are based on BPJ and the previous permit.

Outfall 101 – The intermittent discharge of treated sanitary wastewater

Parameter	Proposed Permit Limitations		Monitoring Frequency
	Monthly Average	Daily Maximum	
Flow (MGD)	Report	Report	1/month
TSS	30 mg/l	45 mg/L	1/month
BOD_5	30 mg/l	45 mg/L	1/month
Fecal Coliform	200 col./100 mL	400 col./100 mL	1/month

EFFLUENT LIMITATIONS BASIS for Outfall 101:

Flow: The requirement to report flow is based upon LAC 33:IX.2707.I.1.b.

TSS, BOD_5, Fecal Coliform: Limitations based upon the Class I Sanitary General permit, Schedule B (LAG530000) and the previous permit.

Outfall 002 - The intermittent discharge of low contamination potential stormwater runoff and utility wastewaters including but not limited to safety shower-eyewash stations and fire water

Parameter	Proposed Permit Limitations		Monitoring Frequency
	Monthly Average	Daily Maximum	
Flow (MGD)	Report	Report	1/quarter
pH	6.0 s.u. (Min)	9.0 s.u. (Max)	1/quarter
TOC	---	50 mg/L	1/quarter
Oil & Grease	---	15 mg/L	1/quarter

EFFLUENT LIMITATIONS BASIS for Outfall 002:

Flow: The requirement to report flow is based upon LAC 33:IX.2707.I.1.b.

TOC, Oil & Grease: Limitations are based upon the previous permit and LDEQ's stormwater guidance [letter dated 6/17/87, from J. Dale Givens (LDEQ) to Myron Knudson (EPA Region 6)].

pH: Requirements are based upon LAC 33:IX.1113.C.1.

C. MONITORING FREQUENCIES

Monitoring frequencies for all outfalls are based upon office guidance for similar discharges and/or the previous permit.

IX. Compliance History/DMR Review:

A. Compliance History – There are no open enforcement actions against the facility as of November 2, 2009

B. DMR Review – Excursions reported 1/1/2007 – 10/31/2009*

Date	Parameter	Outfall	Reported	Permit Limit
9/09	TOC	001	293 mg/L	50 mg/L
9/09	TOC	002	212 mg/L	50 mg/L
5/08	TSS	101	84 mg/l	45 mg/L
1/08	Fecal Col.	101	3,600 col./100 mL	400 col./100 mL
11/07	TSS	101	108 mg/L	45 mg/L
9/07	Fecal Col.	101	2,300 col./100 mL	400 col./100 mL
3/07	TSS	101	46 mg/L	45 mg/L

*Hexion Specialty Chemicals, Inc. was referred to enforcement on January 6, 2010 due to the excursions listed above.

C. Inspections – The last inspection of the facility was a multi-media inspection conducted on 3/5/2007. No areas of concern were noted.

X. Endangered Species:

The receiving waterbodies for Hexion Specialty Chemicals, Inc. are Subsegment 070301 of the Mississippi River Basin and Subsegment 040404 of the Lake Pontchartrain Basin. The receiving waterbody, Subsegment 040404 of the Lake Pontchartrain Basin is not listed in Section II.2 of the Implementation Strategy as requiring consultation with the U.S. Fish and Wildlife Service (FWS). Segment 070301 of the Mississippi River Basin has been identified by the U.S. Fish and Wildlife Service (FWS) as habitat for the Pallid Sturgeon, which is listed as a threatened or endangered species. However, in accordance with the Implementation Strategy, no consultation with the U.S. Fish and Wildlife Service (FWS) is required because the facility is not expected to discharge any of the substances listed in Section II.2. This strategy was submitted with a letter dated November 18, 2008, from Rieck (FWS) to Nolan (LDEQ). Therefore, in accordance with the Memorandum of Understanding between the LDEQ and the FWS, no further informal (Section 7, Endangered Species Act) consultation is required. It was determined that the issuance of the LPDES permit is not likely to have an adverse effect on any endangered or candidate species or the critical habitat. The effluent limitations established in the permit ensure protection of aquatic life and maintenance of the receiving water as aquatic habitat.

XI. Historic Sites:

The discharge is from an existing facility location, which does not include an expansion on undisturbed soils. Therefore, there should be no potential effect to sites or properties on or eligible for listing on the National Register of Historic Places, and in accordance with the "Memorandum of Understanding for the Protection of Historic Properties in Louisiana Regarding LPDES Permits" no consultation with the Louisiana State Historic Preservation Officer is required.

XII. Tentative Determination:

On the basis of preliminary staff review, the Department of Environmental Quality has made a tentative determination to issue a permit for the discharges described in the application.

XIII. Variances:

No requests for variances have been received by this Office.

XIV. Public Notices:

Upon publication of the public notice, a public comment period shall begin on the date of publication and last for at least 30 days thereafter. During this period, any interested persons may submit written comments on the draft permit and may request a public hearing to clarify issues involved in the permit decision at this Office's address on the first page of the statement of basis. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing.

A public notice will be published in a local newspaper of general circulation and in the Office of Environmental Services Public Notice Mailing List.

XV. TMDL Waterbodies:

Hexion Specialty Chemicals, Inc. discharges utility wastewaters and sanitary wastewater to the Mississippi River (Segment 070301), and sanitary wastewater and stormwater runoff to an unnamed drainage ditch thence to New River (Segment 040404). Segment 070301 is not listed on LDEQ's Final 2006 303(d) List, as impaired, and to date no TMDLs have been established. Segment 040404 of the Lake Pontchartrain Basin is currently impaired for organic enrichment/low DO and pathogen indicators. TMDLs are scheduled for completion by March 31, 2011, with an EPA backstop date of March 31, 2012. This Office has determined that due to the nature of the discharges from Hexion Specialty Chemicals, Inc., there is no potential to discharge pollutants that could contribute to organic enrichment or pathogen indicators at a level that could cause or contribute to further impairment of the receiving stream. The TOC requirements established in the permit are appropriate to indicate if there are elevated levels of organic materials in the discharge.

A reopener clause will be included in the permit to allow for the establishment of more stringent effluent limitations and requirements as imposed by any future TMDLs.

XVI. Stormwater Pollution Prevention Plan (SWP3) Requirements:

In accordance with LAC 33:IX.2707.I.3 and 4 [40 CFR 122.44(I)(3) and (4)], a Part II condition is proposed for applicability to all storm water discharges from the facility, either through permitted outfalls or through outfalls which are not listed in the permit or as sheet flow. For first time permit issuance, the Part II condition requires a Storm Water Pollution Prevention Plan (SWP3) within six (6) months of the effective date of the final permit. For renewal permit issuance, the Part II condition requires that the Storm Water Pollution Prevention Plan (SWP3) be reviewed and updated, if necessary, within six (6) months of the effective date of the final permit. If the permittee maintains other plans that contain duplicative information, those plans could be incorporated by reference to the SWP3. Examples of these type plans include, but are not limited to: Spill Prevention Control and Countermeasures Plan (SPCC), Best Management Plan (BMP), Response Plans, etc. The conditions will be found in the draft permit. Including Best Management Practice (BMP) controls in the form of a SWP3 is consistent with other LPDES and EPA permits regulating similar discharges of stormwater associated with industrial activity, as defined in LAC 33:IX.2522.B.14 [40 CFR 122.26(b)(14)].

Appendix A

Water Quality Spreadsheet and Documentation

wqsmodn.wk4 Date: 01/21 Appendix A-1 Page 1
Developer: Bruce Fielding Time: 04:09 PM
Software: Lotus 4.0 LA0111180 / AI 92534
Revision date: 05/10/01

Water Quality Screen for Hexion Specialty Chemicals, Inc.

Input variables:

Receiving Water Characteristics:

Receiving Water Name=	Mississippi River
Critical flow (Qr) cfs=	141955
Harm. mean/avg tidal cfs=	366748
Drinking Water=1 HHNPCR=2	1
Marine, 1=y, 0=n	
Rec. Water Hardness=	153.4
Rec. Water TSS=	32
Fisch/Specific=1,Stream=0	
Diffuser Ratio=	

Effluent Characteristics:

Permittee=	Hexion Specialty Chemicals, Inc.
Permit Number=	LA0111180
Facility flow (Qef),MGD=	0.148
Outfall Number =	001
Eff. data, 2=lbs/day	1
MQL, 2=lbs/day	
Effluent Hardness=	N/A
Effluent TSS=	N/A
WQBL ind. 0=y, 1=n	
Acute/Chr. ratio 0=n, 1=y	1
Aquatic,acute only1=y,0=n	

Page Numbering/Labeling

Appendix	Appendix A-1
Page Numbers 1=y, 0=n	1
Input Page # 1=y, 0=n	1

Fischer/Site Specific inputs:

Pipe=1,Canal=2,Specific=3	
Pipe width, feet	
ZID plume dist., feet	
MZ plume dist., feet	
HHnc plume dist., feet	
HHc plume dist., feet	

Fischer/site specific dilutions:

F/specific ZID Dilution =	---
F/specific MZ Dilution =	---
F/specific HHnc Dilution=	---
F/specific HHc Dilution=	---

Dilution:

ZID Fs =	0.033333
MZ Fs =	0.333333
Critical Qr (MGD)=	91745.52
Harm. Mean (MGD)=	237029.2
ZID Dilution =	0.000048
MZ Dilution =	0.000005
HHnc Dilution=	0.000002
HHc Dilution=	6.2E-007
ZID Upstream =	20663.4
MZ Upstream =	206634
MZhhnc Upstream=	619902.1
MZhhc Upstream=	160549
ZID Hardness=	---
MZ Hardness=	---
ZID TSS=	---
MZ TSS=	---

Multipliers:

WLAa --> LTAa	0.32
WLAc --> LTAc	0.53
LTA a,c-->WQBL avg	1.31
LTA a,c-->WQBL max	3.11
LTA h --> WQBL max	2.38
WQBL-limit/report	2.13
WLA Fraction	1
WQBL Fraction	1

Conversions:

ug/L-->lbs/day Qef	0.001234
ug/L-->lbs/day Qeo	0
ug/L-->lbs/day Qr	1183.905
lbs/day-->ug/L Qeo	810.1627
lbs/day-->ug/L Qef	810.1627
diss-->tot 1=y0=n	1
Cu diss->tot1=y0=n	1
cfs-->MGD	0.6463

Receiving Stream:

Default Hardness=	25
Default TSS=	10
99 Crit., 1=y, 0=n	1

Toxicity Dilution Series:

Biomonitoring dilution:	0.000048
Dilution Series Factor:	0.75

	Percent Effluent
Dilution No. 1	0.006%
Dilution No. 2	0.0048%
Dilution No. 3	0.0036%
Dilution No. 4	0.0027%
Dilution No. 5	0.0020%

Partition Coefficients; Dissolved-->Total

METALS	FW
Total Arsenic	2.223578
Total Cadmium	3.549121
Chromium III	5.282524
Chromium VI	1
Total Copper	3.56078
Total Lead	6.6
Total Mercury	2.785159
Total Nickel	3.174756
Total Zinc	4.535534

Aquatic Life, Dissolved Metal Criteria, ug/L

METALS	ACUTE	CHRONIC
Arsenic	339.8	150
Cadmium	50.5572	1.414322
Chromium III	779.0334	252.7104
Chromium VI	15.712	10.582
Copper	27.5752	17.70626
Lead	102.5669	3.996886
Mercury	1.734	0.012
Nickel	2032.775	225.756
Zinc	164.4582	150.1753

Site Specific Multiplier Values:

CV =	---
N =	---
WLAa --> LTAa	---
WLAc --> LTAc	---
LTA a,c-->WQBL avg	---
LTA a,c-->WQBL max	---
LTA h --> WQBL max	---

(*1) Toxic Parameters	(*2) Instream Conc. ug/L	(*3) CuEffluent /Tech (Avg) ug/L	(*4) Effluent /Tech (Max) ug/L	(*5) MQL ug/L	(*6) Effluent 1=No 95% 0=95 %	(*7) 95th % estimate Non-Tech ug/L	(*8) Numerical Criteria Acute FW ug/L	(*9) Chronic FW ug/L	(*10) HHDW ug/L	(*11) HH Carcinogen Indicator *C*
NONCONVENTIONAL										
Total Phenols (4AAP)				5			700	350	5	
3-Chlorophenol				10					0.1	
4-Chlorophenol				10			383	192	0.1	
2,3-Dichlorophenol				10					0.04	
2,5-Dichlorophenol				10					0.5	
2,6-Dichlorophenol				10					0.2	
3,4-Dichlorophenol				10					0.3	
2,4-Dichlorophenocy-acetic acid (2,4-D)				---					100	
2-(2,4,5-Trichlorophen-oxy) propionic acid (2,4,5-TP, Silvex)				---					10	
METALS AND CYANIDE										
Total Arsenic				10			755.5719	333.5367	111.1789	
Total Cadmium				1			179.4336	5.019602	35.49121	
Chromium III				10			4115.263	1334.949	264.1262	
Chromium VI				10			15.712	10.582	50	C
Total Copper		0.024		10	0	0.05112	98.18922	63.04811	3560.78	
Total Lead				5			676.9417	26.37945	330	
Total Mercury				0.2			4.829466	0.033422	5.570319	
Total Nickel		0.094		40	0	0.20022	6453.566	716.7203		
Total Zinc				20			745.906	681.1252	22677.67	
Total Cyanide				20			22.36	5.2	663.8	
DIOXIN										
2,3,7,8 TCDD; dioxin			*********						*********	C
VOLATILE COMPOUNDS										
Benzene				10			2249	1125	1.1	C
Bromoform				10			2930	1465	3.9	C
Bromodichloromethane				10					0.2	C
Carbon Tetrachloride				10			2730	1365	0.22	C
Chloroform				10			2890	1445	5.3	C
Dibromochloromethane				10					0.39	C
1,2-Dichloroethane(EDC)				10			11800	5900	0.36	C
1,1-Dichloroethylene				10			1160	580	0.05	C
1,3-Dichloropropylene				10			606	303	9.86	
Ethylbenzene				10			3200	1600	2390	
Methyl Chloride				50			55000	27500		
Methylene Chloride				20			19300	9650	4.4	C
1,1,2,2-Tetrachloro-ethane				10			932	466	0.16	C

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(*1) Toxic Parameters	(*12) WLAa Acute ug/L	(*13) WLAc Chronic ug/L	(*14) WLAh HHDW ug/L	(*15) LTAa Acute ug/L	(*16) LTAc Chronic ug/L	(*17) LTAh HHDW ug/L	(*18) Limiting A,C,HH ug/L	(*19) WQBL Avg 002 ug/L	(*20) WQBL Max 001 ug/L	(*21) WQBL Avg 001 lbs/day	(*22) WQBL Max 001 lbs/day	(*23) Need WQBL?
NONCONVENTIONAL												
Total Phenols (4AAP)	1.4E+007	7.2E+007	3099516	4628827	3.8E+007	3099516	3099516	3099516	7376847	3825.794	9105.39	no
3 Chlorophenol	---	---	61990.31	---	---	61990.31	61990.31	61990.31	147536.9	76.51588	182.1078	no
4 Chlorophenol	7914467	4E+007	61990.31	2532629	2.1E+007	61990.31	61990.31	61990.31	147536.9	76.51588	182.1078	no
2,3-Dichlorophenol	---	---	24796.13	---	---	24796.13	24796.13	24796.13	59014.78	30.60635	72.84312	no
2,5-Dichlorophenol	---	---	309951.6	---	---	309951.6	309951.6	309951.6	737684.7	382.5794	910.539	no
2,6-Dichlorophenol	---	---	123980.6	---	---	123980.6	123980.6	123980.6	295073.9	153.0318	364.2156	no
3,4-Dichlorophenol	---	---	185970.9	---	---	185970.9	185970.9	185970.9	442610.8	229.5477	546.3234	no
2,4-Dichlorophenocy-acetic acid (2,4-D)	---	---	6.2E+007	---	---	6.2E+007	6.2E+007	6.2E+007	1.5E+008	76515.88	182107.8	no
2-(2,4,5-Trichlorophen-oxy) propionic acid (2,4,5-TP, Silvex)	---	---	6199031	---	---	6199031	6199031	6199031	1.5E+007	7651.588	18210.78	no
METALS AND CYANIDE												
Total Arsenic	1.6E+007	6.9E+007	6.9E+007	4996302	3.7E+007	6.9E+007	4996302	6545155	1.6E+007	8078.816	19179.48	no
Total Cadmium	3707889	1037226	2.2E+007	1186525	549729.6	2.2E+007	549729.6	720145.8	1709659	888.8903	2110.266	no
Chromium III	8.5E+007	2.8E+008	1.6E+008	2.7E+007	1.5E+008	1.6E+008	2.7E+007	3.6E+007	8.5E+007	44001.7	104462.1	no
Chromium VI	324679.1	2186612	8E+007	103897.3	1158904	8E+007	103897.3	136105.5	323120.7	167.9977	398.8343	no
Total Copper	2029022	1.3E+007	2.2E+009	649286.9	6904613	2.2E+009	649286.9	850565.9	2019282	1049.87	2492.441	no
Total Lead	1.4E+007	5450918	2E+008	4476351	2888986	2E+008	2888986	3784572	8984748	4671.373	11090.05	no
Total Mercury	99798.05	6906.138	3453058	31935.38	3660.253	3453058	3660.253	4794.932	11383.39	5.91848	14.05074	no
Total Nickel	1.3E+008	1.5E+008	---	4.3E+007	7.8E+007	---	4.3E+007	5.6E+007	1.3E+008	69003.6	163817.7	no
Total Zinc	1.5E+007	1.4E+008	1.4E+010	4932385	7.5E+007	1.4E+010	4932385	6461424	1.5E+007	7975.465	18934.12	no
Total Cyanide	462056.1	1074502	4.1E+008	147857.9	569486.2	4.1E+008	147857.9	193693.9	459838.2	239.0803	567.5875	no
DIOXIN												
2,3,7,8 TCDD; dioxin	---	---	*********	---	---	**********	**********	**********	**********	**********	**********	no
VOLATILE COMPOUNDS												
Benzene	4.6E+007	2.3E+008	1761705	1.5E+007	1.2E+008	1761705	1761705	1761705	4192858	2174.508	5175.328	no
Bromoform	6.1E+007	3E+008	6246044	1.9E+007	1.6E+008	6246044	6246044	6246044	1.5E+007	7709.618	18348.89	no
Bromodichloromethane	---	---	320310	---	---	320310	320310	320310	762337.7	395.365	940.9687	no
Carbon Tetrachloride	5.6E+007	2.8E+008	352341	1.8E+007	1.5E+008	352341	352341	352341	838571.5	434.9015	1035.066	no
Chloroform	6E+007	3E+008	8488214	1.9E+007	1.6E+008	8488214	8488214	8488214	2E+007	10477.17	24935.67	no
Dibromochloromethane	---	---	624604.4	---	---	624604.4	624604.4	624604.4	1486559	770.9618	1834.889	no
1,2-Dichloroethane(EDC)	2.4E+006	1.2E+009	576558	7.8E+007	6.5E+008	576558	576558	576558	1372208	711.657	1693.744	no
1,1-Dichloroethylene	2.4E+007	1.2E+008	80077.49	7670627	6.4E+007	80077.49	80077.49	80077.49	190584.4	98.84125	235.2422	no
1,3-Dichloropropylene	1.3E+007	6.3E+007	6112245	4007241	3.3E+007	6112245	4007241	5249486	1.2E+007	6479.546	15382.74	no
Ethylbenzene	6.6E+007	3.3E+008	1.5E+009	2.1E+007	1.8E+008	1.5E+009	2.1E+007	2.8E+007	6.6E+007	34215.42	81228.98	no
Methyl Chloride	1.1E+009	5.7E+009	---	3.6E+008	3E+009	---	3.6E+008	4.8E+008	1.1E+009	586077.6	1396123	no
Methylene Chloride	4E+008	2E+009	7046819	1.3E+008	1.1E+009	7046819	7046819	7046819	1.7E+007	8698.03	20701.31	no
1,1,2,2-Tetrachloro-ethane	1.9E+007	9.6E+007	256248	6162952	5.1E+007	256248	256248	256248	609870.2	316.292	752.775	no

(*1) Toxic Parameters	(*2) Instream Conc. ug/L	(*3) CuEffluent /Tech (Avg) ug/L	(*4) Effluent /Tech (Max) ug/L	(*5) MQL ug/L	(*6) Effluent 95th % 1=No 95% 0=95 %	(*7) estimate Non-Tech ug/L	(*8) Numerical Criteria Acute FW ug/L	(*9) Chronic FW ug/L	(*10) HHDW ug/L	(*11) HH Carcinogen Indicator "C"
VOLATILE COMPOUNDS (cont'd)										
Tetrachloroethylene				10			1290	645	0.65	C
Toluene				10			1270	635	6100	
1,1,1-Trichloroethane				10			5280	2640	200	
1,1,2-Trichloroethane				10			1800	900	0.56	C
Trichloroethylene				10			3900	1950	2.8	C
Vinyl Chloride				10					1.9	C
ACID COMPOUNDS										
2-Chlorophenol				10			258	129	0.1	
2,4-Dichlorophenol				10			202	101	0.3	
BASE NEUTRAL COMPOUNDS										
Benzidine				50			250	125	0.00008	C
Hexachlorobenzene				10					0.00025	C
Hexachlorabutadiene				10			5.1	1.02	0.09	C
PESTICIDES										
Aldrin				0.05			3		0.00004	C
Hexachlorocyclohexane (gamma BHC, Lindane)				0.05			5.3	0.21	0.11	C
Chlordane				0.2			2.4	0.0043	0.00019	C
4,4'-DDT				0.1			1.1	0.001	0.00019	C
4,4'-DDE				0.1			52.5	10.5	0.00019	C
4,4'-DDD				0.1			0.03	0.006	0.00027	C
Dieldrin				0.1			0.2374	0.0557	0.00005	C
Endosulfan				0.1			0.22	0.056	0.47	
Endrin				0.1			0.0864	0.0375	0.26	
Heptachlor				0.05			0.52	0.0038	0.00007	C
Toxaphene				5			0.73	0.0002	0.00024	C
Other Parameters:										
Fecal Colif. (col/100ml)										
Chlorine							19	11		
Ammonia								4000		
Chlorides										
Sulfates										
TDS		2650000			0	5644500		400000		
Goldbook Values:										

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Hexion Specialty Chemicals, Inc.
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(*1)	(*12)	(*13)	(*14)	(*15)	(*16)	(*17)	(*18)	(*19)	(*20)	(*21)	(*22)	(*23)
Toxic	WLAa	WLAc	WLAh	LTAa	LTAc	LTAh	Limiting	WQBL	WQBL	WQBL	WQBL	Need
Parameters	Acute	Chronic	HHDW	Acute	Chronic	HHDW	A,C,HH	Avg	Max	Avg	Max	WQBL?
								001	001	001	001	
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	lbs/day	lbs/day	
Tetrachloroethylene	2.7E+007	1.3E+008	1041007	8530266	7.1E+007	1041007	1041007	1041007	2477598	1284.936	3058.148	no
Toluene	2.6E+007	1.3E+008	3.8E+009	8398014	7E+007	3.8E+009	8398014	1.1E+007	2.6E+007	13579.25	32237.75	no
1,1,1-Trichloroethane	1.1E+008	5.5E+008	1.2E+008	3.5E+007	2.9E+008	1.2E+008	3.5E+007	4.6E+007	1.1E+008	56455.45	134027.8	no
1,1,2-Trichloroethane	3.7E+007	1.9E+008	896867.9	1.2E+007	9.9E+007	896867.9	896867.9	896867.9	2134546	1107.022	2634.712	no
Trichloroethylene	8.1E+007	4E+008	4484340	2.6E+007	2.1E+008	4484340	4484340	4484340	1.1E+007	5535.11	13173.56	no
Vinyl Chloride	---	---	3042945	---	---	3042945	3042945	3042945	7242209	3755.968	8939.203	no
ACID COMPOUNDS												
2-Chlorophenol	5331416	2.7E+007	61990.31	1706053	1.4E+007	61990.31	61990.31	61990.31	147536.9	76.51588	182.1078	no
2,4-Dichlorophenol	4174210	2.1E+007	185970.9	1335747	1.1E+007	185970.9	185970.9	185970.9	442610.8	229.5477	546.3234	no
BASE NEUTRAL COMPOUNDS												
Benzidine	5166101	2.6E+007	128.124	1653152	1.4E+007	128.124	128.124	128.124	304.9351	0.158146	0.376387	no
Hexachlorobenzene	---	---	400.3875	---	---	400.3875	400.3875	400.3875	952.9222	0.494206	1.176211	no
Hexachlorabutadiene	105388.5	210767.7	144139.5	33724.31	111706.9	144139.5	33724.31	44178.84	104882.6	54.53083	129.4587	no
PESTICIDES												
Aldrin	61993.21	---	64.06199	19837.83	---	64.06199	64.06199	64.06199	152.4675	0.079073	0.188194	no
Hexachlorocyclohexane (gamma BHC, Lindane)	109521.3	43393.36	176170.5	35046.83	22998.48	176170.5	22998.48	30128.01	71525.27	37.1876	88.28506	no
Chlordane	49594.57	888.5307	304.2945	15870.26	470.9213	304.2945	304.2945	304.2945	724.2209	0.375597	0.89392	no
4,4'-DDT	22730.85	206.635	304.2945	7273.87	109.5166	304.2945	109.5166	143.4667	340.5965	0.177084	0.420405	no
4,4'-DDE	1084881	2169668	304.2945	347162	1149924	304.2945	304.2945	304.2945	724.2209	0.375597	0.89392	no
4,4'-DDD	619.9321	1239.81	432.4185	198.3783	657.0994	432.4185	198.3783	259.8756	616.9565	0.32077	0.761522	no
Dieldrin	4905.73	11509.57	80.07749	1569.833	6100.073	80.07749	80.07749	80.07749	190.5844	0.098841	0.235242	no
Endosulfan	4546.169	11571.56	291354.5	1454.774	6132.928	291354.5	1454.774	1905.754	4524.347	2.35231	5.584492	no
Endrin	1785.405	7748.814	161174.8	571.3295	4106.872	161174.8	571.3295	748.4416	1776.835	0.923816	2.193183	no
Heptachlor	10745.49	785.2132	112.1085	3438.557	416.163	112.1085	112.1085	112.1085	266.8182	0.138378	0.329339	no
Toxaphene	15085.02	41.32701	384.372	4827.205	21.90331	384.372	21.90331	28.69334	68.11931	0.035417	0.084081	no
Other Parameters:												
Fecal Colif. (col/100ml)	---	---	---	---	---	---	---	---	---	---	---	no
Chlorine	392623.7	2272986	---	125639.6	1204682	---	125639.6	164587.8	390739.1	203.1541	482.2971	no
Ammonia	---	8.3E+008	---	---	8.3E+008	---	8.3E+008	8.3E+008	1.7E+009	1336482	3172869	no
Chlorides	---	---	---	---	---	---	---	---	---	---	---	no
Sulfates	---	---	---	---	---	---	---	---	---	---	---	no
TDS	---	6.4E+011	---	---	3.4E+011	---	3.4E+011	4.4E+011	1.1E+012	5.5E+008	1.3E+009	no
	---	---	---	---	---	---	---	---	---	---	---	no
	---	---	---	---	---	---	---	---	---	---	---	no
	---	---	---	---	---	---	---	---	---	---	---	no

APPENDIX A-2
LA0111180 / AI No. 92534

Documentation and Explanation of Water Quality Screen
and Associated Lotus Spreadsheet

Each reference column is marked by a set of parentheses enclosing a number and asterisk, for example (*1) or (*19). These columns represent inputs, existing data sets, calculation points, and results for determining Water Quality Based Limits for an effluent of concern. The following represents a summary of information used in calculating the water quality screen:

Receiving Water Characteristics:

Receiving Water: Mississippi River
Critical Flow, Qrc (cfs): 141,955
Harmonic Mean Flow, Qrh (cfs): 366,748
Segment No.: 070301
Receiving Stream Hardness (mg/L): 153.4
Receiving Stream TSS (mg/L): 32
MZ Stream Factor, Fs: 1/3
Plume distance, Pf: N/A

Effluent Characteristics:

Company: Hexion Speciality Chemicals, Inc.
Facility flow, Qe (MGD): 0.148
Effluent Hardness: N/A
Effluent TSS: N/A
Pipe/canal width, Pw: N/A
Permit Number: LA0111180

Variable Definition:
Qrc, critical flow of receiving stream, cfs
Qrh, harmonic mean flow of the receiving stream, cfs
Pf = Allowable plume distance in feet, specified in LAC 33:IX.1115.D
Pw = Pipe width or canal width in feet
Qe, total facility flow , MGD
Fs, stream factor from LAC.33.IX Chapter 11 (1 for harmonic mean flow)
Cu, ambient concentration, ug/L
Cr, numerical criteria from LAC.33.IX.1113, Table 1
WLA, wasteload allocation
LTA, long term average calculations
WQBL, effluent water quality based limit
ZID, Zone of Initial Dilution in % effluent
MZ, Mixing Zone in % effluent

Formulas used in aquatic life water quality screen (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Qe}{(Qrc \times 0.6463 \times Fs + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Static water bodies (in the absence of a site specific dilution):

Discharge from a pipe:

$$\text{Critical Dilution} = \frac{(2.8)\ Pw\ \pi^{1/2}}{Pf}$$

$$WLA = \frac{(Cr-Cu)\ Pf}{(2.8)\ Pw\ \pi^{1/2}}$$

Discharge from a canal:

$$\text{Critical Dilution} = \frac{(2.38)(Pw^{1/2})}{(Pf)^{1/2}}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{1/2}}{2.38\ Pw^{1/2}}$$

Formulas used in human health water quality screen, human health non-carcinogens (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Qe}{(Qrc \times 0.6463 + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Qrc \times 0.6463 \times Cu)}{Qe}$$

Formulas used in human health water quality screen, human health carcinogens (dilution type WLA):

$$\text{Dilution Factor} = \frac{Qe}{(Qrh \times 0.6463 + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Qrh \times 0.6463 \times Cu)}{Qe}$$

Static water bodies in the absence of a site specific dilution (human health carcinogens and human health non-carcinogens):

Discharge from a pipe:

$$\text{Critical Dilution} = \frac{(2.8)\ Pw\ \pi^{1/2}}{Pf}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{*}}{(2.8)\ Pw\ \pi^{1/2}}$$

Discharge from a canal:

$$\text{Critical Dilution} = \frac{(2.38)(Pw^{1/2})}{(Pf)^{1/2}}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{1/2*}}{2.38\ Pw^{1/2}}$$

* Pf is set equal to the mixing zone distance specified in LAC 33:IX.1115 for the static water body type, i.e., lake, estuary, Gulf of Mexico, etc.

If a site specific dilution is used, WLA are calculated by subtracting Cu from Cr and dividing by the site specific dilution for human health and aquatic life criteria.

$$WLA = \frac{(Cr-Cu)}{\text{site specific dilution}}$$

Long Term Average Calculations:
LTAa = WLAa X 0.32
LTAc = WLAc X 0.53
LTAh = WLAh

WQBL Calculations:
Select most limiting LTA to calculate daily max and monthly avg WQBL

If aquatic life LTA is more limiting:
Daily Maximum = Min(LTAa, LTAc) X 3.11
Monthly Average = Min(LTAc, LTAc) X 1.31

If human health LTA is more limiting:
Daily Maximum = LTAh X 2.38
Monthly Average = LTAh

Mass Balance Formulas:

mass (lbs/day): (ug/L) X 1/1000 X (flow, MGD) X 8.34 = lbs/day

$$\text{concentration(ug/L)}: \frac{\text{lbs/day}}{\text{(flow, MGD) X 8.34 X 1/1000}} = \text{ug/L}$$

The following is an explanation of the references in the spreadsheet.

(*1) Parameter being screened.
(*2) Instream concentration for the parameter being screened in ug/L. In the absence of accurate supporting data, the instream concentration is assumed to be zero (0).
(*3) Monthly average effluent or technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
(*4) Daily maximum technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
(*5) Minimum analytical Quantification Levels (MQLs). Established in a letter dated January 27, 1994 from Wren Stenger of EPA Region 6 to Kilren Vidrine of LDEQ and from the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". The applicant must test for the parameter at a level at least as sensitive as the specified MQL. If this is not done, the MQL becomes the application value for screening purposes if the pollutant is suspected to be present on-site and/or in the waste stream. Units are in ug/l or lbs/day depending on the units of the effluent data.

(*6) States whether effluent data is based on 95th percentile estimation. A "1" indicates that a 95th percentile approximation is being used, a "0" indicates that no 95th percentile approximation is being used.

(*7) 95th percentile approximation multiplier (2.13). The constant, 2.13, was established in memorandum of understanding dated October 8, 1991 from Jack Ferguson of Region 6 to Jesse Chang of LDEQ and included in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". This value is screened against effluent Water Quality Based Limits established in columns (*18) - (*21). Units are in ug/l or lbs/day depending on the units of the measured effluent data.

(*8) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, acute criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.

Hardness Dependent Criteria:

Metal	Formula
Cadmium	$e^{(1.1280[\ln(\text{hardness})] - 1.6774)}$
Chromium III	$e^{(0.8190[\ln(\text{hardness})] + 3.6880)}$
Copper	$e^{(0.9422[\ln(\text{hardness})] - 1.3884)}$
Lead	$e^{(1.2730[\ln(\text{hardness})] - 1.4600)}$
Nickel	$e^{(0.8460[\ln(\text{hardness})] + 3.3612)}$
Zinc	$e^{(0.8473[\ln(\text{hardness})] + 0.8604)}$

Dissolved to Total Metal Multipliers for Freshwater Streams (TSS dependent):

Metal	Multiplier
Arsenic	$1 + 0.48 \times TSS^{-0.73} \times TSS$
Cadmium	$1 + 4.00 \times TSS^{-1.13} \times TSS$
Chromium III	$1 + 3.36 \times TSS^{-0.93} \times TSS$
Copper	$1 + 1.04 \times TSS^{-0.74} \times TSS$
Lead	$1 + 2.80 \times TSS^{-0.80} \times TSS$
Mercury	$1 + 2.90 \times TSS^{-1.14} \times TSS$
Nickel	$1 + 0.49 \times TSS^{-0.57} \times TSS$
Zinc	$1 + 1.25 \times TSS^{-0.70} \times TSS$

Dissolved to Total Metal Multipliers for Marine Environments (TSS dependent):

Metal	Multiplier
Copper	$1 + (10^{4.86} \times TSS^{-0.72} \times TSS) \times 10^{-6}$
Lead	$1 + (10^{6.06} \times TSS^{-0.85} \times TSS) \times 10^{-6}$

Zinc $1 + (10^{5.36} \times TSS^{-0.52} \times TSS) \times 10^{-6}$

If a metal does not have multiplier listed above, then the dissolved to total metal multiplier shall be 1.

(*9) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, chronic criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.
Hardness dependent criteria:

Metal	Formula
Cadmium	$e^{(0.7852[\ln(\text{hardness})] - 3.4900)}$
Chromium III	$e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$
Copper	$e^{(0.8545[\ln(\text{hardness})] - 1.3860)}$
Lead	$e^{(1.2730[\ln(\text{hardness})] - 4.7050)}$
Nickel	$e^{(0.8460[\ln(\text{hardness})] + 1.1645)}$
Zinc	$e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$

Dissolved to total metal multiplier formulas are the same as (*8), acute numerical criteria for aquatic life protection.

(*10) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, human health protection, drinking water supply (HHDW), non-drinking water supply criteria (HHNDW), or human health non-primarry contact recreation (HHNPCR) (whichever is applicable). A DEQ and EPA approved Use Attainability Analysis is required before HHNPCR is used, e.g., Monte Sano Bayou. Units are specified.

(*11) C if screened and carcinogenic. If a parameter is being screened and is carcinogenic a "C" will appear in this column.

(*12) Wasteload Allocation for acute aquatic criteria (WLAa). Dilution type WLAa is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the acute aquatic numerical criteria for that parameter. Units are in ug/L. Dilution WLAa formulas for streams:

$$WLAa = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAa formulas for static water bodies:
WLAa = (Cr-Cu)/Dilution Factor)
Cr represents aquatic acute numerical criteria from column (*8).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*13) Wasteload Allocation for chronic aquatic criteria (WLAc). Dilution type WLAc is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the chronic aquatic numerical criteria for that parameter. Units are in ug/L. Dilution WLAc formula:

$$WLAc = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAc formulas for static water bodies:
WLAc = (Cr-Cu)/Dilution Factor)
Cr represents aquatic chronic numerical criteria from column (*9).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*14) Wasteload Allocation for human health criteria (WLAh). Dilution type WLAh is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the human health numerical criteria for that parameter. Units are in ug/L. Dilution WLAh formula:

$$WLAh = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Qrc,Qrh \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAh formulas for static water bodies:
WLAh = (Cr-Cu)/Dilution Factor)
Cr represents human health numerical criteria from column (*10).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*15) Long Term Average for aquatic numerical criteria (LTAa). WLAa numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.32.
WLAa X 0.32 = LTAa.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*16) Long Term Average for chronic numerical criteria (LTAc). WLAc numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.53.
WLAc X 0.53 = LTAc.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*17) Long Term Average for human health numerical criteria (LTAh). WLAh numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 1.
WLAc X 1 = LTAh.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then a blank shall appear in this column.

(*18) Limiting Acute, Chronic or Human Health LTA's. The most limiting LTA is placed in this column. Units are consistent with the WLA calculation.
If standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then the type of limit, Aquatic or Human Health (HH), is indicated.

(*19) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 1.31 to determine the average WQBL ($LTA_{limiting\ aquatic}$ X 1.31 = $WQBL_{monthly\ average}$). If human health criteria was the most limiting criteria then LTAh = $WQBL_{monthly\ average}$. If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then either the human health criteria or the chronic aquatic life criteria shall appear in this column depending on which is more limiting.

(*20) End of pipe Water Quality Based Limit (WQBL) daily maximum in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 3.11 to determine the daily maximum WQBL ($LTA_{limiting\ aquatic}$ X 3.11 = $WQBL_{daily\ max}$). If human health criteria was the most limiting criteria then LTAh is multiplied by 2.38 to determine the daily maximum WQBL ($LTA_{limiting\ aquatic}$ X 2.38 = $WQBL_{daily\ max}$). If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDLs, then either the human health criteria or the acute aquatic life criteria shall appear in this column depending on which is more limiting.

(*21) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. The mass limit is determined by using the mass balance equations above. Monthly average WQBL, ug/l/1000 X facility flow, MGD X 8.34 = monthly average WQBL, lbs/day.

(*22) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. Mass limit is determined by using the mass balance equations above. Daily maximum WQBL, ug/l/1000 X facility flow, MGD X 8.34 = daily maximum WQBL, lbs/day.

(*23) Indicates whether the screened effluent value(s) need water quality based limits for the parameter of concern. A "yes" indicates that a water quality based limit is needed in the permit; a "no" indicates the reverse.